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(54) Projection television for use in a vehicle

(57) A projection television system 20 for use in a vehicle includes a console for mounting to the roof of a vehicle with a housing 40 in which a video projector for television signals is fixedly mounted. The console further includes a cover 50 which is pivotally mounted to the housing at its forward end for movement between a closed position, substantially enclosing the projector, and an open position. A projection screen 60 is movably mounted to the housing to move the screen between a substantially horizontal stored position within the cover and housing, and a substantially vertical use position when the cover is opened. The console further includes light blocking panels 80 coupled between the cover and housing for enclosing the sides of the space between the projector and screen for providing a dark environment therebetween.

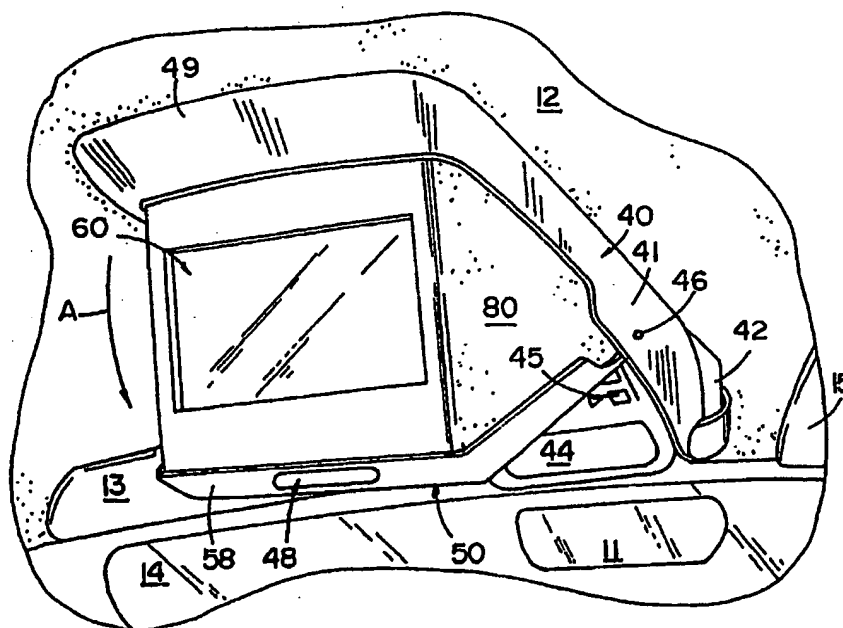


FIG. 2

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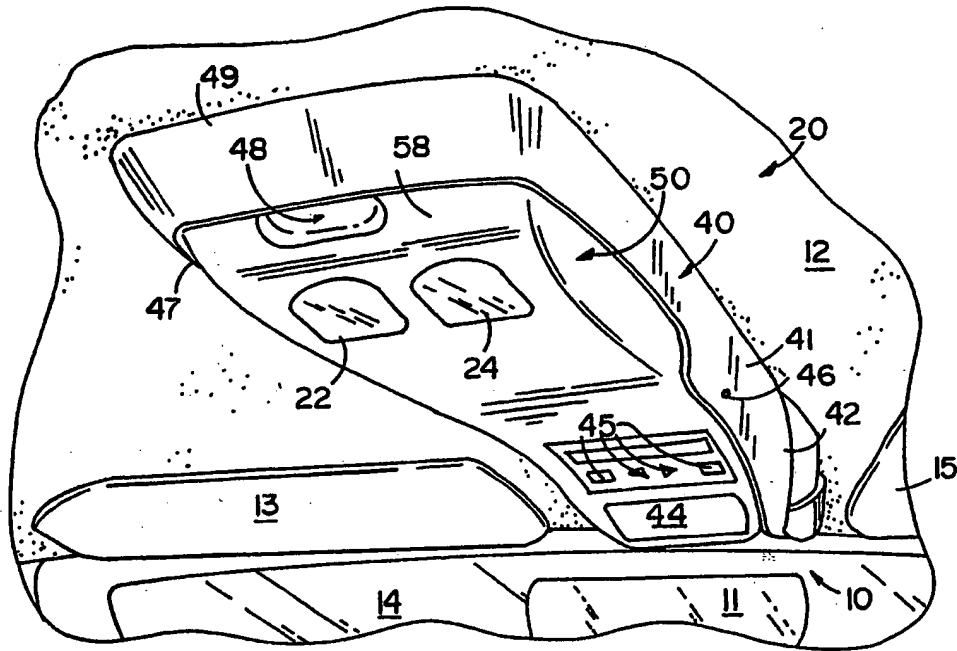


FIG. 1

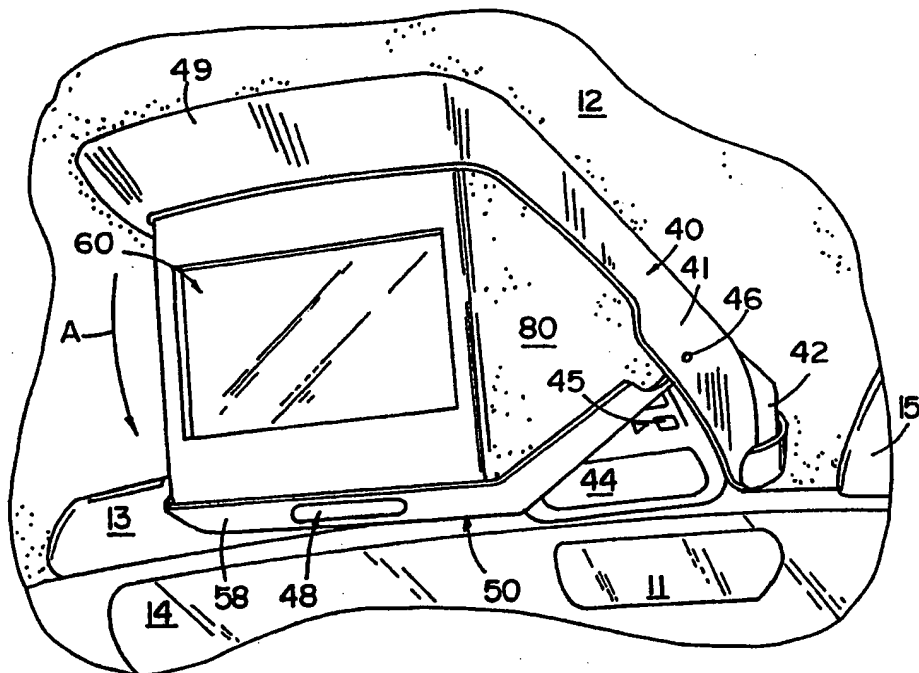
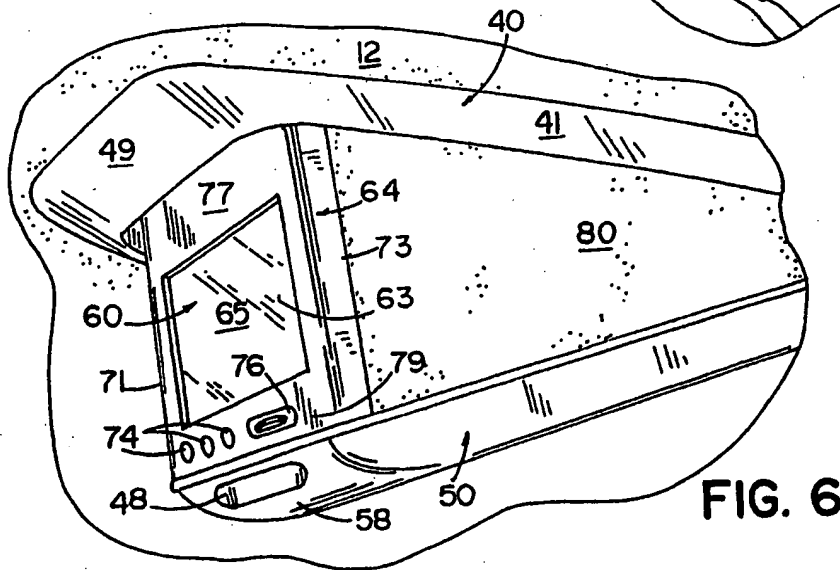
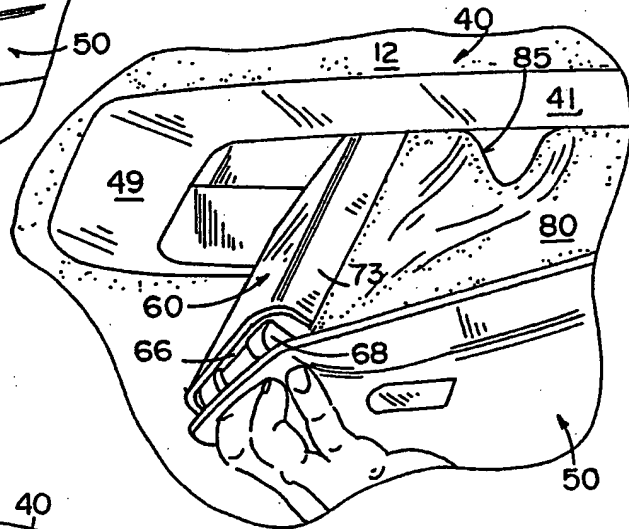
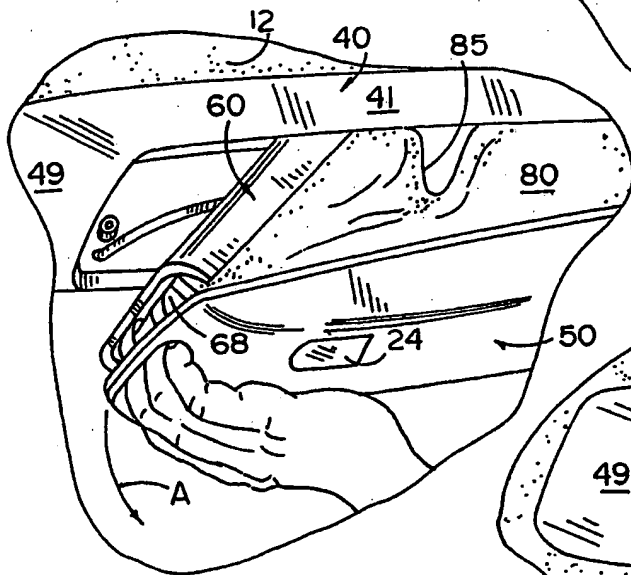
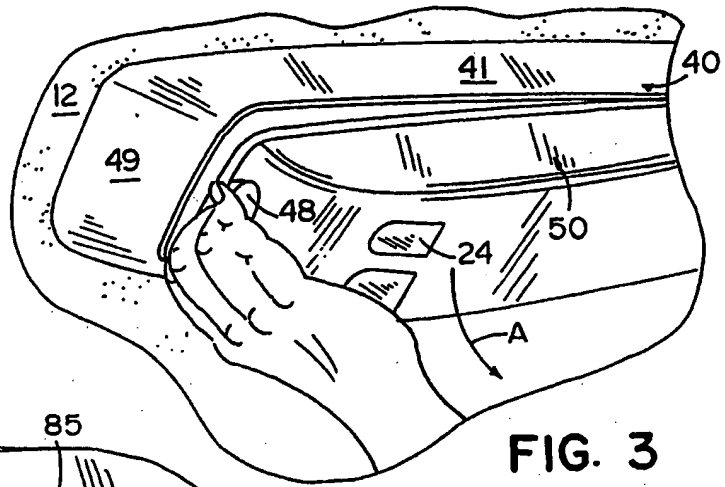


FIG. 2



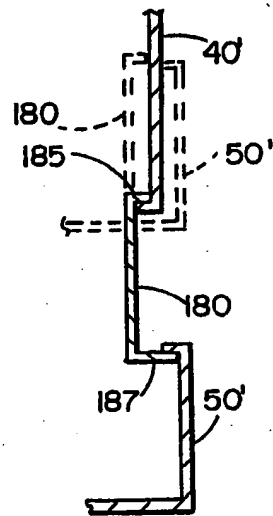


FIG. 12

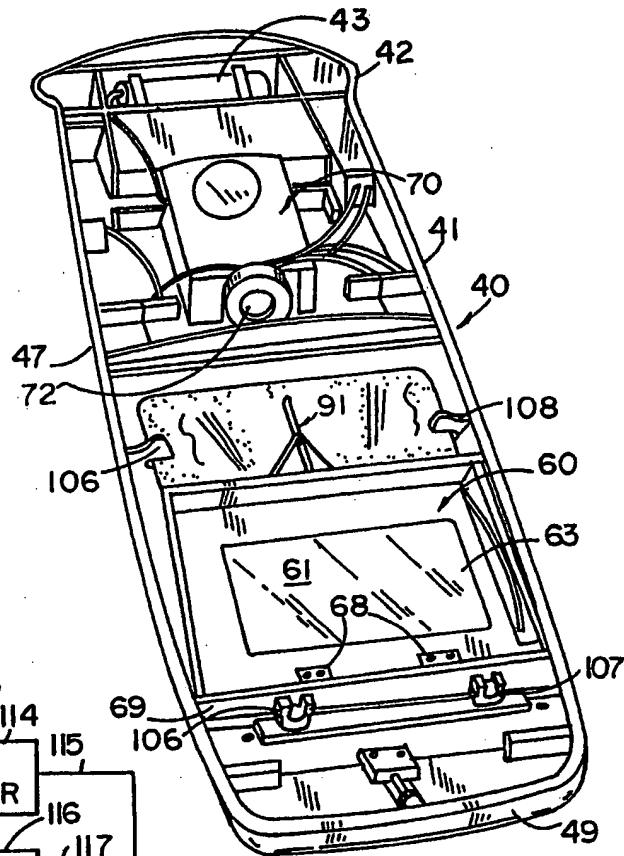


FIG. 7

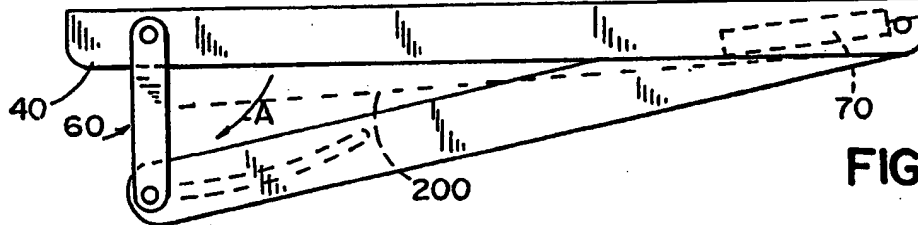
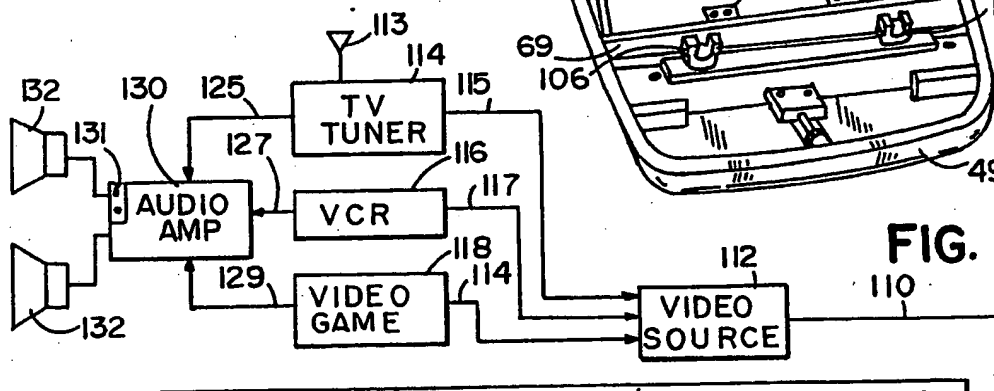


FIG. 13

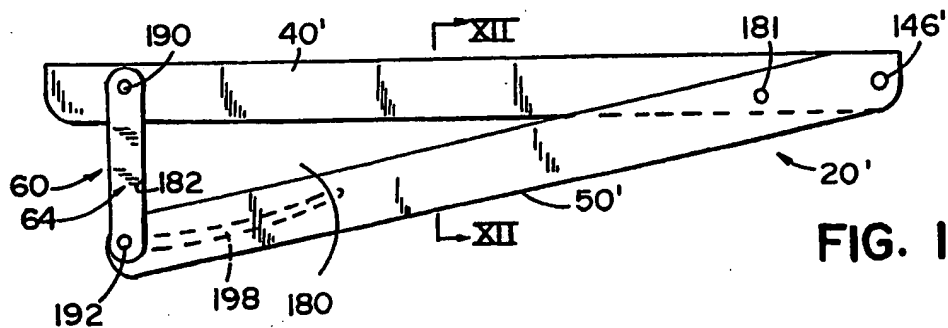


FIG. 11

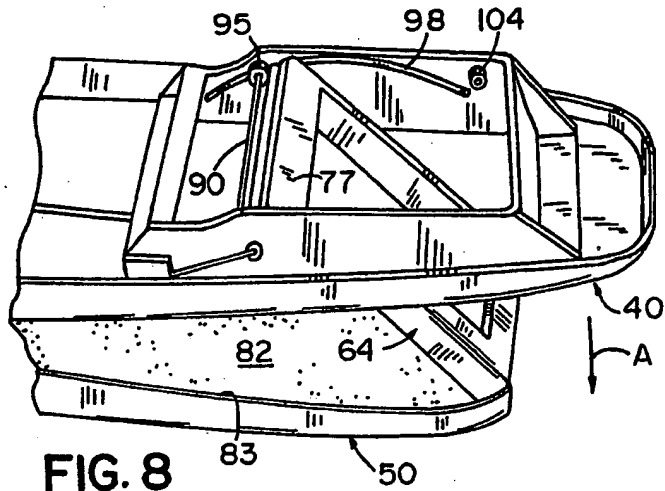


FIG. 8

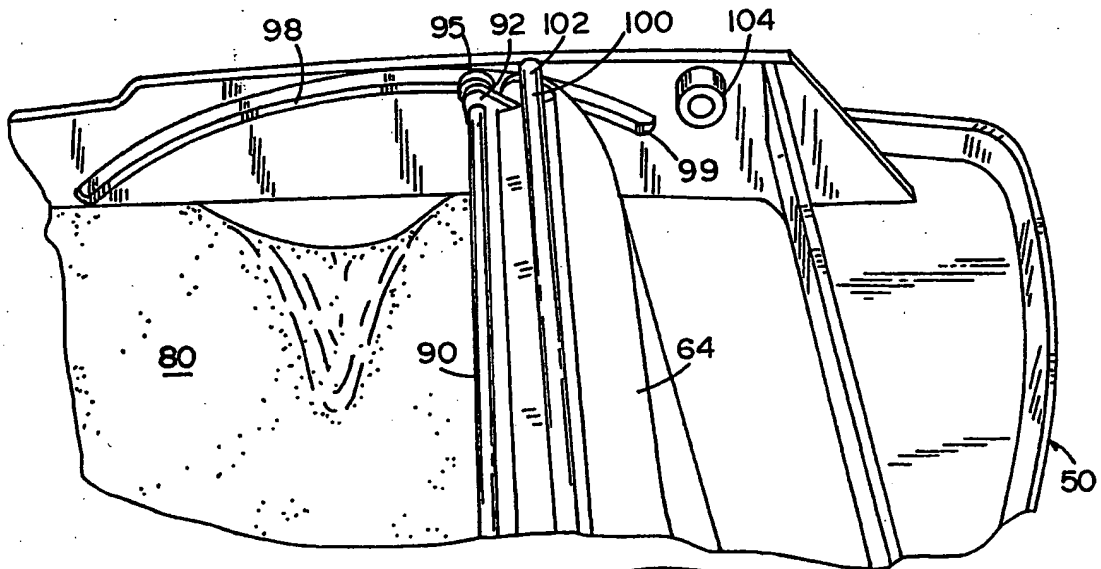


FIG. 9

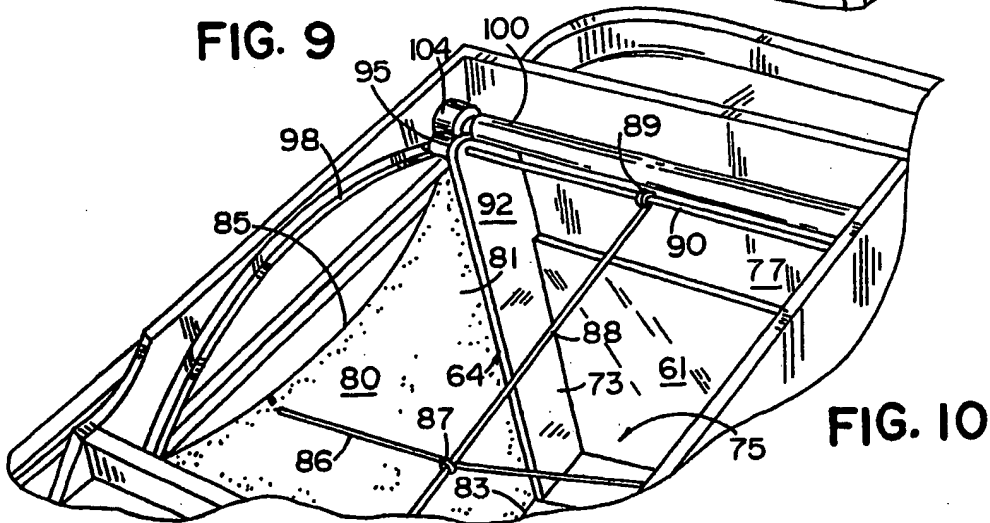


FIG. 10

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1 PROJECTED DISPLAY SYSTEM FOR A VEHICLE

BACKGROUND OF THE INVENTION

 The present invention relates to a vehicle
television display and particularly to an overhead mounted
5 projection system for displaying video television format
information within a vehicle.

 There have been several systems available for use
in connection with limousines, mini-vans, van conversions
and motor homes which provide small screen conventional
10 televisions within a vehicle overhead console for use by
rear seat passengers for either watching television
broadcast signals or for watching a video tape through a VCR
connected to the television. More recent installations have
included relatively small and expensive color LCD flat
15 screen displays which can be pivoted down from a raised
horizontal stored position within a vehicle overhead console
to a lowered, generally vertically extending, use position.

 The disadvantage of such an LCD direct display is
that it is very expensive and is limited to a relatively
20 small picture display which cannot be easily viewed by rear
seat passengers. Larger sized LCD video displays are not
currently commercially available and prototype models are
extremely expensive. Conventional CRT display tubes of
significant size are too large for storage in the overhead
25 of smaller vehicles such as conventional automobiles even
though relatively small CRT's have been used in, for
example, limousines, motor homes and vans. As a result,
economical larger screen television displays have not been
generally available for vehicles such as automobiles.

1 SUMMARY OF THE INVENTION

 The system of the present invention, however,
provides an economical, larger video display by providing a
projection system in which a compact, relatively flat, video
5 projector is fixedly mounted in a vehicle overhead console
and a flat, rectangular projection screen is movably mounted
to the console to move between a generally horizontal stored
position in the console and a lowered, generally vertical,
use position in spaced alignment from the projector for
10 providing a television raster-type display for vehicles.
The small projector and movable mounting system for the
projection screen allows for compact unobtrusive storage of
the display system when not in use, and yet provides a
bright, relatively larger, viewable screen when in use. The
15 projector is coupled to television signals from sources such
as a television tuner, a VCR or other NTSC video signal
source, such as video games which can be mounted in the door
panels or floor consoles for easy access by rear seat
passengers.

20 Projection systems embodying the present invention
include a console for mounting to the roof of a vehicle with
a housing in which a video projector for television signals
is fixedly mounted. The console further includes a cover
for selectively enclosing the lower end of the housing and
25 movable between a closed position, substantially enclosing
the projector, and an open position. A projection screen
and means for movably mounting the screen to the housing and
cover allow movement of the screen between a substantially
horizontal stored position within the cover and housing, and
30 a substantially vertical use position when the cover is
opened.

1 The console further includes, in a preferred
embodiment, light blocking means coupled between the cover
and housing for enclosing the sides of the space between the
projector and screen for providing a dark environment
5 between the projector and the surface of the screen facing
the projector. In one embodiment of the present invention,
the enclosing means are pivoted panels, and in another
embodiment comprise flexible fabric. Both systems collapse
to a stored position within the housing when the cover is
10 moved to the closed position.

These and other features, objects and advantages
of the present invention will best be understood by
reference to the following description thereof together with
the accompanying drawings in which:

15 BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a fragmentary perspective view of a
vehicle including a projection system embodying the present
invention shown in a stored position;

20 Fig. 2 is a fragmentary perspective view of the
system of Fig. 1 shown in a use position;

Fig. 3 is a fragmentary perspective view showing
the unlatching of the cover for the lowering of the
projection system from the stored position shown in Fig. 1
to the use position shown in Fig. 2;

25 Fig. 4 is a fragmentary perspective view showing
the movement of the projection screen from the stored
position toward the use position;

Fig. 5 is a fragmentary perspective view showing
the progressive movement of the projection screen from the
stored position toward the use position;

30

1 Fig. 6 is a perspective view of the projection
screen and light blocking structure shown in the use
position;

5 Fig. 7 is a top perspective view of the console
shown removed from the vehicle and including the projector
and movable screen of the present invention;

10 Fig. 8 is an enlarged, fragmentary, top
perspective view of the screen mounting mechanism shown also
in Figs. 4, 5, and 7 shown with the screen in a partly
extended position;

15 Fig. 9 is an enlarged, fragmentary, perspective
view of the screen and mounting structure shown in a nearly
fully extended use position;

20 Fig. 10 is an enlarged, fragmentary, rear facing,
top perspective view showing the inside of the console with
the screen in its fully extended use position;

25 Fig. 11 is a side elevational view of an
alternative embodiment of the projection system of the
present invention shown in a use position;

30 Fig. 12 is an enlarged cross-sectional view of one
side of the structure shown in Fig. 11 taken along section
line XII-XII of Fig. 11; and

Fig. 13 is a schematic and block diagram view of
the electrical and projection system of the present
invention.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

Referring initially to Fig. 1, there is shown a
vehicle 10 such as an automobile and particularly the
overhead or roof area 12 of the vehicle looking toward the
front windshield 14 from the rear seat area. The vehicle
may include a rear view mirror 11 mounted in the central

1 upper area of the windshield and a pair of visors 13 and 15
mounted to the roof 12 on the driver and passenger sides
respectively.

5 Mounted to the roof of the vehicle and between the
visors is a console 20 embodying the present invention. The
console 20 is an elongated, generally rectangular structure
mounted with its longitudinal axis extending along the
center line of the vehicle as shown. The console includes a
housing 40 to which there is pivotally mounted a cover 50
10 which can be selectively lowered as seen in Fig. 2 to expose
a rear facing projection screen 60 for a television video
projector 70 (Fig. 7) which is mounted within the housing 40
near the forward end 42 thereof. The housing 40 can be
mounted to the roof of the vehicle using a plurality of
15 spaced conventional fasteners such as shown at 106 and 108
in Fig. 7.

Mounted in the forward end 42 of housing 40 may be a
variety of vehicle options such as a digital, alphanumeric
display 44 for an electrical compass 43 (Fig. 7) and
20 suitable control switches 45 for providing compass display
information on the LCD or vacuum fluorescent display 44.
Display 44 may also be employed to display temperature or
other vehicle operating parameter information. For such
purpose, the console 20 is mounted to the vehicle with
25 display 44 near the windshield 14 and readily visible to the
driver while the projection screen 60, for the
television-type (i.e. raster) display is visible only to the
rear seat passengers. A compass system suitable for
mounting within the console 20 and housing 40 thereof is
30 disclosed in U.S. Patent No. 4,953,305 issued on September

1 4, 1990 and entitled VEHICLE COMPASS WITH AUTOMATIC
CONTINUOUS CALIBRATION and assigned to the present assignee.

5 Cover 50 is pivotally mounted between side walls
41 and 47 of the housing 40 by means of pivot pins 46 with a
conventional latch assembly 48 mounted to the rear edge 58
of cover 50 and engaging a catch mounted to the inner edge
of rear wall 49 of housing 44, releasing the cover from its
raised, latched and stored position shown in Fig. 1 to allow
its downward movement in a direction indicated by arrow A in
10 Figs. 2-5 for use of the projector.

15 The console 20 may also include a pair of courtesy
lights 22 and 24 mounted to the cover 50 near its rear edge
58 such that when the cover is closed in a raised stored
position, as shown in Fig. 1, the console with the courtesy
lights 22 and 24 coupled to the vehicle's electrical system
conveniently provides overhead courtesy lights from the
console 20.

20 As cover 50 is unlatched from housing 40 and
lowered progressively, as illustrated in Figs. 3-6, means
coupling the projection screen 60 between the housing and
cover allow the screen assembly 60 to be moved from a
substantially horizontal stored position as seen in Fig. 7
within the housing, to a substantially vertical use position
shown in Figs. 2, 6, and 10. Before describing the means
25 for mounting the screen between the cover and housing to
achieve this function, it is briefly noted that in the first
embodiment shown in Figs. 3-6, the screen assembly 60 is
pivotally mounted at its lower edge to the rear edge 58 of
cover 50 and is controllably guided by slot means in the
inner walls of the sides of housing 40 such that lowering of
30 the cover urges the screen from its horizontal position to

1 its vertical use position. In the Figs. 11 and 12
embodiment, this mounting arrangement is reversed as
described below.

5 In the lowered use position shown in Figs. 2, 6,
and 10, projected light 200 (Fig. 13) from lens 72 of the
video projector 70 (Fig. 7) is transmitted through an
enclosed darkened cavity 75 (Fig. 10) of the console for
projecting a television image directly onto the rear surface
61 of the projection screen 63. The cavity is enclosed from
10 incident ambient light by side panel means 80 and 82 on each
of the sides, such that light from the projector 70 will
provide a bright image to the user on the projection screen
63. Having briefly described the overall concept of
applicant's invention, a more detailed description,
15 particularly of the mounting of the screen assembly between
the cover and housing is presented in connection with Figs.
4-10.

Referring initially to Fig. 6, it is seen that the
screen assembly 60 includes a generally molded polymeric
20 frame 64 with vertically extending sides 71 and 73, a top
edge 77 and a bottom edge 79 into which a translucent
rectangular screen 63 is mounted. Screen 63 has a rear
surface 61 which may have a suitably textured surface, such
as a lenticular pattern or by being sandblasted, for
25 providing a bright, clear image to the viewer of the
opposite or front surface 65 of screen 63. The frame 64 may
include controls for the video projector 70 such as power on
and off and other control switches 74 and a contrast control
knob 76 which are mounted to the lower edge 79 of frame 64
30 and coupled electrically to the projector 70 by conventional
electrical conductors (not shown).

1 The lower edge 79 of frame 64 includes a pair of
spaced pivot hinges 68, which pivotally couples the frame
and screen 63 therein, to an inner transversely extending
support wall 69 extending between the sides 41 and 47 of
5 housing 40 as best seen in Fig. 7. This allows the screen
assembly 60 to pivot from the horizontal stored position
shown in Fig. 7 to a raised, generally vertically extending
position, as seen in Figs. 2 and 6.

 Mounted to the top of frame 64 between sides 71
10 and 73 is a transversely extending guide rod 90 (Figs. 8-10)
which extends between upper forwardly located extensions 92
of the sides of frame 64. Rod 90 extends through apertures
in extensions 92 on each side of the frame 64 and includes
guide rollers 95 at its ends. Rollers 95 fit within arcuate
15 slots 98 formed on the inside of walls 41 and 47 of the
housing 40 such that, as the cover 50 is lowered in a
direction indicated by arrow A in the Figs., the upper edge
77 of the screen assembly 60 is drawn rearwardly by the
guide rollers 95 extending in the arcuate tracks 98 on each
20 side, to stabilize and control the motion of the screen
assembly as it moves into a generally vertical position as
the lower edge 79 pivots on hinges 68.

 Extending along the top 77 of frame 64 in parallel
spaced relationship to guide rod 90 is a locking bar 100
25 having ends 102, which ride over a compressible circular
stop 104 mounted to the inside surface of each of the side
walls 41 and 47 of housing in an over-center snap locking
relationship for releasably holding the screen assembly in a
lowered use position once the cover has been fully opened,
30 and yet allowing the cover to be closed by urging the rear
end 58 upwardly in a direction opposite arrow A in the

1 Figures. For such purpose, rod 100 is spaced from rod 90 a
distance such that ends 102 will ride on a side of the
circular rubber stop member 104 opposite the stop-forming
ends 99 of tracks 98 with the guide member 95 substantially
5 butting the end 99 of the guide track, as seen in Fig. 10.

Coupled to the sides 71 and 73 of frame 64 in the
embodiment shown in Figs. 1-10 are flexible generally
triangular black light opaque fabric panels 80 and 82 which
are collapsed, as best seen in Figs. 4 and 5, when the
10 screen is in a stored position but which unfold to fill in
the triangular sides of the projection system when fully
opened. The flexible fabric panels 80 and 82 effectively
block ambient light from entering the cavity 75 to provide a
bright image to the viewer. Each of the panels 80 and 82
15 include a forward edge 81 (Fig. 10) which is attached to the
sides 71 and 73 of the projection screen frame 64 on a
continuous line extending the height of the frame. The
flexible fabric similarly is coupled at its lower edges 83
to the upper inner edges of cover 50 as also seen in Figs. 8
20 and 10. The upper edges 85 of flexible panels 80 and 82,
however, include a welt not attached to the housing 40 to
allow the fabric to collapse within the housing and cover
with the pivoting closing movement of the projection screen
assembly 60. The flexible material unfolds to fill in the
25 sides as best seen in Figs. 4 and 5, when the screen is
lowered for use.

In order to ensure that the fabric sides 80 and 82
fully raise and enclose the interior projecting space within
the housing between the projector and screen, a flexible
30 wire 86 (Fig. 10) extends between the top edges 85 of fabric
panels 80 and 82 approximately at the midway position of the

1 longitudinal axis of the projection housing. Wire 86
includes a loop 87 surrounding a flexible control cord 88
which is anchored at its rearward end 89 to the center of
rod 90 as seen in Fig. 10, and at its forward end 89' to the
5 housing as seen in Fig. 7. When the screen 60 is in an
extended position, cord 88 becomes taut thereby raising wire
86 to a horizontal position at the top of the projection
area within the housing and cover near the lower edge of the
housing and above the projected image area of the system.
10 This assures the flexible fabric side panels 80 and 82 are
fully raised and prevent light from leaking within the
interior space of the projection area. In some embodiments,
such as the preferred embodiment shown in Figs. 11 and 12
one or more pivoted, rigid, side panels are employed making
15 this additional structure unnecessary.

The projector 70 is a relatively compact flat
rectangular projector which projects through a small
selective multi-color light transmitting LCD chip modulated
with NTSC video signals and using a high intensity light
20 source. The projector in the preferred embodiment is a
model P-40U projector commercially available from Fujix, and
integrally includes the electrical circuitry for processing
NTSC signals and modulating the LCD chip. The projector
includes a lens 72 (Fig. 7) for the rear projection of the
25 television image onto a screen, such as the screen 63 of the
present invention. The focal length of the projection lens
can be adjusted and depending on the length of the housing
for console 20, the screen 60 can take on a variety of
sizes. In the compact system shown in the Figs. of the
30 present invention, the screen size was 6 inches along the
diagonal although this represents approximately the smallest

1 size available with this particular projector. By
elongating the housing somewhat and/or moving the projector
forwardly and eliminating the electrical compass display,
larger screens can be provided. Naturally, for larger
5 vehicles such as vans and motor homes, the screen size can
be increased significantly without additional significant
expense. In such modifications it will be apparent that the
rear end of the console would be enlarged to accommodate the
larger screen size. The projector 70 can be modified by
10 eliminating the audio components of the commercially
available projector and utilizing the vehicle's own audio
system, as seen in the block and schematic diagram of Fig.
13 as described below.

Referring now to Figs. 11 and 12, there is shown
15 an alternative and preferred embodiment of the invention in
which the flexible sides 80 and 82 are replaced with a
housing 40' which is somewhat vertically deeper than the
housing 40 of the previous embodiment and a cover 50' which
likewise is somewhat deeper than cover 50 of the previous
20 embodiment. In order to block light from the triangular
areas between the lower edge of housing 40' and the upper
edge of cover 50', at least one thin, triangular panel 180
(on opposite sides of the console) is provided. Each of the
panels 180 are pivotally coupled by a pivot connection 181
25 to the housing 40' near the forward end thereof and in
spaced relationship to the pivot connection 146' of cover
50' to housing 40'. As the cover 50' is moved to a lowered
use position the thin panels 180 on each side of the console
extend from their overlapping compact relationship within
30 the console 20'. As best seen in the vertical, cross-
sectional view of Fig. 12, the side panel 180 is nested

1 within the housing 40' and cover 50' and includes
interengaging upper and lower outwardly extending lips 185
and 187 respectively, which engage inwardly extending ledges
in the cover 50' and housing 40' in the extended position.
5 The front edge 182 of the panels may be slidably mounted to
a vertically extending groove formed in the forward facing
side walls of the frame 64 of projection screen 60 to
maintain the alignment of the side panels 180 with respect
to the screen as the panels pivot between the compact stored
10 position and the lowered use position.

The side panels 180 may include a single panel in
some embodiments or overlapping leaf-type multiple panels
slidably interconnected in a conventional manner for larger
sized projection screens with a larger triangular side area
15 which must be blocked against incident light for use of the
projection system during daylight hours. In the embodiment
shown in Figs. 11 and 12, the screen frame 64 is pivotally
mounted by spaced hinges 190 at its upper end to the housing
40' and a guide rod 192 at its lower edge has ends which
20 extend within an arcuate slot 198 on the inside of cover 50'
in reverse relationship to the structure shown in the
embodiments in Figs. 4-10, such that the screen pivots from
the top and pivots and slides at the bottom as opposed to
pivoting at the bottom and sliding at the top, as in the
25 previous embodiment. The embodiment shown in Figs. 11 and
12 allow the use of a relatively larger screen which does
not project downwardly from the lower edge of the housing
40' as far as the system shown in the earlier embodiment.
In the event of an impact force at the lower corner of the
30 projection screen, this embodiment will collapse more
readily for safety purposes.

1 Cover 50' may include a latch similar to the latch
used in the earlier embodiment for holding the cover closed
in a stored position when not in use, thus having a
substantially identical appearance as shown in Fig. 1. The
5 embodiment shown in Figs. 11 and 12 thus reverses the
mounting of the screen providing the pivoted mounting of the
screen at its upper end to the housing while the lower end
rides within the track of the cover such that the screen
pivots forwardly and upwardly from its lower end as it is
10 moved to a stored position.

 Referring now to Fig. 13, it is seen that the
projector 70 receives NTSC video signals from a desired
source and projects these signals onto the rear projection
screen. The screen 60 shown in the schematic diagram of
15 Fig. 13 pivots downwardly, as in the embodiment shown in
Figs. 11 and 12, from the housing. Projector 70 is mounted
at a suitable angle in the housing such that its lens 72
focuses on the screen. Light is projected along a pathway
200, shown in dotted lines in Fig. 13, in a darkened
20 environment provided by the sides 80 and 82 in the
embodiment shown in Figs. 3-6 or the shutter-type side
panels 180 described in connection with Figs. 11 and 12.

 The NTSC signals provided to projector 70 and
supplied by a video cable 110 which can be trained
25 underneath the vehicle headliner and coupled to the output
of a video source selector switch 112. In the embodiment
shown, switch 112 is a three position switch with three
inputs for coupling any one of the inputs to output cable
110. One of the inputs to switch 112 is provided by
30 conductor 115 coupled to the output of a TV tuner 114
coupled to a television receiving antenna 113. A second

1 switch input is coupled by conductor 117 to the video output
of a compact VCR 116. The video output from a video game
118 is coupled to the third input of switch 112 by conductor
119. The audio outputs from each of these sources 114, 116,
5 and 118 can be conventionally coupled to the speaker system
existent in the vehicle or to a separate audio system for
rear seat use only. Thus, the audio outputs 125, 127, and
129 of the sources 114, 116, 118 may be coupled to an audio
10 amplifier 130 which is coupled to the vehicle's speaker
system or its own speaker system as represented
schematically by the speakers 132 in Fig. 13.

Alternatively, the audio amplifier 130 includes
headphone jacks 131 such that headphones (not shown) can be
employed to listen to the audio portion of the entertainment
15 provided by the television projection system of the present
invention so as not to distract the vehicle driver. Each of
the components 114, 116, 118, and 130 can be mounted within
a floor console at the center of the vehicle rear seat area
for convenient use by either of the rear seat passengers, in
20 one of the side doors of the vehicle, or at another suitable
location. The television tuner 114 and VCR 116 may be an
integral unit having its own infrared remote control to
allow even more convenient use by the passengers.

With the system of the present invention
25 therefore, the rear seat passengers are provided with a
television viewing system which allows entertainment of the
rear seat passengers, such as children, during long trips
without distracting the vehicle operator and providing them
with a relatively large screen television which is easily
30 viewable. The utilization of a projection system which is
now commercially available at relatively low cost, as

1 compared to direct view LCD panels, economically provides a
relatively large screen display. The movable mounting of
the screen provides a safe system for use in vehicles and
one which can be readily stored when not in use so as to be
5 used as a normal overhead console, and prevent any
distraction whatsoever to the vehicle operator.

It will become apparent to those skilled in the
art that various modifications to the preferred embodiments
of the invention described herein can be made without
10 departing from the spirit or scope thereof as defined by the
appended claims.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

-1-

1 A system for the projected display of television signals in a vehicle overhead console comprising:

 a housing for mounting to the roof of a vehicle, said housing including a television signal projector mounted
5 therein to project a television image rearwardly with respect to the vehicle;

 a cover mounted to said housing for movement between a closed position and an open position for use of said projector; and

10 a projection screen and means for movably mounting said screen to said housing for movement between a substantially horizontal stored position when said cover is closed and a substantially vertical position for use when said cover is open, for use of said projector.

-2-

1 The system as defined in claim 1 wherein said cover is pivotally mounted to said housing near a forward end of said housing.

-3-

1 The system as defined in claim 2 wherein said means for movably mounting said screen to said housing comprises pivot means coupling an upper edge of said screen to said housing.

-4-

1 The system as defined in claim 3 wherein said means for movably mounting said screen to said housing

-16-

5 further includes pin means extending from a lower edge of
said screen and wherein said cover includes slot means into
which said pin means extends for guiding said lower end of
said screen to urge said screen to a raised position as said
cover is moved from an open position to a closed position
and for urging said screen to a lowered position as said
cover is moved from a closed position to an open position.

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1 The system as defined in claim 2 wherein said
means for movably mounting said screen to said housing
comprises pivot means coupling a lower edge of said screen
to said cover near a rear end of said cover.

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1 The system as defined in claim 5 wherein said
means for movably mounting said screen to said housing
further includes pin means extending from an upper edge of
said screen and wherein said housing includes slot means
5 into which said pin means extends for guiding said upper end
of said screen to urge said upper end of said screen to a
forward position as said cover is moved from an open
position to a closed position and for urging said upper end
of said screen to a rearward position as said cover is moved
10 from a closed position to an open position.

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1 The system as defined in claim 1 and further
including sidewall means extending between said cover and
said housing for blocking ambient light when said cover is
in an open position.

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1 The system as defined in claim 7 wherein said
sidewall means comprises rigid panel means and means for

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movably mounting said rigid panel means between said housing
and said cover for extending said panel means to fill in the
5 gap between said housing and cover when said cover is
opened.

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1 The system as defined in claim 7 wherein said
sidewall means comprises flexible panels mounted between
said cover and housing for collapsing when said cover is
closed and extending when said cover is opened to fill in
5 the gap between said housing and cover when said cover is
opened.

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1 An overhead console for the projected display of
television signals in a vehicle, said console comprising:
an elongated housing having a forward end for
mounting to the front of a vehicle roof area of a vehicle
5 and extending rearwardly, said housing including a
television signal projector mounted therein to project a
television image rearwardly with respect to the vehicle;
a cover pivotally mounted near the forward end of
said housing for movement between a closed position and an
10 open position for use of said projector; and
a projection screen and means for movably mounting
said screen to said housing and said cover for movement
between a substantially horizontal stored position when said
cover is closed and a substantially vertical position
15 aligned with said projector when said cover is open for use
of said projector.

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1 The system as defined in claim 10 wherein said
screen is pivotally mounted at one of a top and bottom edge

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to one of said housing and cover and slideably mounted at
the other of said top and bottom edge to the other of said
5 housing and cover.

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1 The system as defined in claim 11 and further
including sidewall means movably coupled to said cover for
covering the gap between said cover and said screen and said
housing when said cover is in an open position to block
5 ambient light from impinging on said screen on a side toward
said projector.

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1 The system as defined in claim 12 and further
including a source of video signals to be displayed by said
screen, said source coupled to said projector.

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1 The system as defined in claim 13 wherein said
video source comprises a television tuner.

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1 The system as defined in claim 13 wherein said
video source comprises a VCR.

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1 The system as defined in claim 13 wherein said
video source comprises a video game.

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1 A projection system for the display of television
signals in a vehicle, said system comprising:

a console including an elongated housing and a
cover for said housing, said housing adapted to be mounted
5 to the roof of a vehicle;

a television signal projector mounted in said
housing to project a television image along the longitudinal

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axis of said housing;

10 means for pivotally mounting said cover to said housing for movement between a closed position and an open position for use of said projector; and

15 a projection screen and means for movably mounting said screen to said housing for movement between a substantially horizontal stored position when said cover is closed and a substantially vertical position aligned with said projector when said cover is open for use of said projector.

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1 The system as defined in claim 17 wherein said means for movably mounting said screen to said housing comprises means for pivotally mounting said screen to said housing.

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1 The system as defined in claim 18 wherein an edge of said screen opposite the pivot mounting of said screen to said housing is coupled to said cover for guided movement of said screen as said cover is moved.

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1 The system as defined in claim 19 and further including side panels movably coupled to said housing to fill in the sides from said screen toward said projector when said cover is pivoted to an open position.

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1 The system as defined in claim 17 and further including flexible side panels movably coupled to said housing to fill in the sides from said screen toward said projector when said cover is pivoted to an open position,

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5 and means coupled to said screen and to said flexible side
panels for extending said side panels when said screen is
moved to a use position.

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1 A system for the projected display of television
signals in a vehicle comprising:

a housing for mounting to the roof of a vehicle,
said housing defining a light tight enclosure including a
5 television signal projector mounted therein to project a
television image rearwardly with respect to the vehicle; and

a projection screen mounted to said housing in
spaced relationship opposite said projector for display of
projected television images.

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Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE DATABASE: WPI	Documents considered relevant following a search in respect of Claims :- 22

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Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.	E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A: Document indicating technological background and/or state of the art.	&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	EP 0131988 A1 (PHILIPS) See Figure 1	22
X	FR 2544675 A (G AGAR ET AL) See whole document and WPI abstract	22
A	US 5146365 (CANON) See Figure 5; column 3, line 5 to line 40	22

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